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Sun™ System Diagnostics Manual

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Introduction

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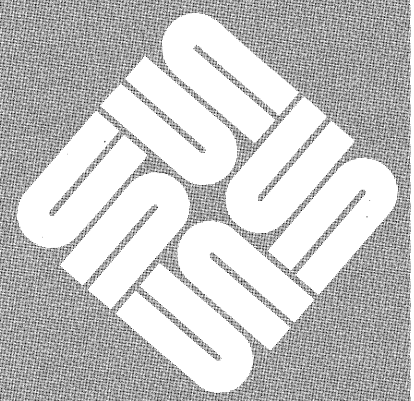


1

Introduction

The Sun System Diagnostic test system, which we shall call `sysdiag`, is a high-level diagnostic designed to exercise system hardware. It runs under the SunOS operating system and is divided into two sections; the tests themselves, and the `sysdiag` menus used to select and configure the tests. The tests cover three major hardware resources; memory, secondary memory (disk and tape), and peripherals. By placing a heavy load on the system, `sysdiag` tests these resources under less-than-ideal conditions. Heavy loading uncovers problems that do not show up when the tests are run under a light or normal load.

Conventions

To make things a little clearer, this manual uses different fonts to identify text used in special ways. The fonts are Roman, `typewriter`, **`typewriter bold`**, **Roman bold**, *Roman italic* and *`typewriter italic`*. They are used as follows:

Roman
: Roman font is the standard for normal text, just as it appears here.

Typewriter
: `Typewriter font` has two meanings, depending on where it appears. It may represent something that appears in the manual exactly as the computer displays it on the screen, or it may represent a program path/name.

Typewriter bold
: **`Typewriter bold`** also has two meanings; when it is used in a section of dialogue in a display, for example, it represents something that you must type verbatim into the computer. It sometimes appears together with regular typewriter font: the computer output appears in typewriter, and what you must type appears in typewriter bold.

  If **`Typewriter bold`** appears in a menu, it is used to highlight the aspect of the menu under discussion.

Bold
: **Bold Roman font** indicates that something deserves more attention than the surrounding text.

Italic

Roman italic font is used for emphasis; `typewriter italic font` appears in display examples to represent variables for which you or the computer must provide the exact details. For example:

```
error:  obs nnnn, exp nnnn
```

Coverage

`sysdiag` can test the following hardware components (if they are installed correctly):

Sun-2 or Sun-3 Systems:

- Xylogics disks — xy or xd 0, 1, 2 and 3
- SCSI disks — sd0, sd1, and sd2
- SCSI ¼ in. tape drive — st0
- Archive ¼ in. tape drive — ar0 (Sun-100U and 150U only)
- ½ in. Magnetic tapes — mt0, mt1 (1600 and/or 6250 BPI)
- SKY FPP (Floating Point Processor) board (Sun-2 Only)
- Serial ports — a and b (all CPU s); 0 through 3 (Multibus SCSI) ;tty00 through tty3F (ALM); and h0 through kf (ALM2) — use the **s** option from the `Intervention` menu.
- Data Communications ports — A0 - D3, B0 - B3 (SCP) and 0 - 15 (MCP)
- Color board — CG2 for Sun-2 or single-buffered CG3
- Ethernet boards — Multibus: ie0, ie1, ec0, ec1; VME: ie1 for second Ethernet controller; first is on the CPU board
- SunIPC boards — pc0 - pc3, d0 - d3 and pp0 - pp3 (for parallel ports)
- GP, GP+, GP2 and GB (Graphics Processor and Buffer) boards — *manufacturing test only*
- Physical memory
- Virtual memory

Sun-3 Systems Only — in addition to components listed above:

- FPA (Floating Point Accelerator) board
- MC68881 (Floating Point Coprocessor)
- Data Ciphering Processor (DCP) — not available outside the United States

Sun-4 Systems Only — in addition to components listed above:

- SF9010FPC (Floating Point Coprocessor)

1.1. Environment

The `sysdiag` system is run as a separate user under the SunOS operating system from the `/usr/diag/sysdiag` directory. The environment is set by the `.login`, `.cshrc`, and `.sunview` files in that directory. You can change the test environment by altering these files, or by altering the `sysdiag` shell script file.

Because of the heavy demand `sysdiag` places on system resources, the system may sometimes appear to be stopped, when it is only running very slowly. This effect is most pronounced on systems with less than 4 Mbytes of memory.

Setting the Display

To use `sysdiag`, the SunOS environment variable `TERM` must reflect the terminal type used as the `sysdiag` console. If the variable isn't set correctly `sysdiag` will not work properly. To fix this, change `TERM`, using the `setterm` command or the `c` command from the `sysdiag` main menu (refer to the *Main Menu* section of *Chapter 2*).

Before changing anything, see what display type is set now. To do this, log in to the device (console or terminal) you plan to run `sysdiag` from (do **not** log in as sysdiag!) and enter the following commands:

```
example% printenv
HOME=...
SHELL=...
PATH=...
TERM=terminal_type

more environment settings...
```

The *`terminal_type`* variable shows what type of terminal the operating system thinks you are working from. The default setting for a user working from the bitmapped display is **sun**. A common setting for a user on a terminal is **tvi925** (a Televideo terminal), **vt100** or **ansi** (a generic ansi terminal). If the *`terminal_type`* accurately describes the device you are using, don't change anything.

If you need to change the terminal type, log into the system on the device where you plan to run `sysdiag`, become root (super-user), and use `setterm` to change *`terminal_type`* to the device type you are using.

```
example login: root
Password: enter password

login messages are displayed

example# /usr/diag/sysdiag/setterm terminal_type
example# logout
example login:
```

The `/etc/termcap` file contains a list of all valid terminal types and their characteristics. In order to see the list of valid terminals, change directories to `/etc` and view the `termcap` file. A typical output line would look like this:

```
Mu|sun|Sun Microsystems Workstation console:\
```

Vertical bars (|) divide the termcap fields. The last field contains a description of the terminal. The second field is the name used to set `sysdiag` to look for that terminal (*terminal_type*). The *terminal_type* is usually **sun**, which is the bit-mapped display on the workstation monitor.

If you are using a terminal connected to the Sun workstation through its RS-232 ports, use the setting that most closely corresponds to the terminal you are using. If you can't find the setting for your terminal in the `termcap` file, try using **ansi**.

Testing Multiple Disks

`sysdiag` automatically tests the first disk drive it finds in the system. If you want it to test multiple disk drives, you must make sure that the device special files are created in the `/dev` directory. Refer to *Appendix A, Multiple Disk Drive Testing* for more information.

Caveats

This section describes some side effects of `sysdiag` that can cause problems. All of them can be avoided if you take proper precautions.

QIC-24

The ¼" tape test has a number of configuration options. One of the options selects the QIC-24 tape format to write and read the tape with. Exercise **extreme caution** when testing a tape drive using the QIC-24 format. If you test a drive with the QIC-24 option and the drive does not support it, the SCSI bus may lock up. The only way to free up the system is to cycle the power and reboot. To avoid this, only test the drive using QIC-24 when you are **certain** the drive supports it. Read the *Tape Test* section in *Chapter 2* and *Appendix A* for details.

Renamed files

Under certain circumstances, `sysdiag` will rename the files `/dev/sky` (when a Sky board is tested) and `/etc/ttys` to `/dev/sky-sd` and `/etc/ttys-sd` respectively. Before it exits, `sysdiag` changes the files back to their proper names. If `sysdiag` terminates abnormally, however, one or both of the files may still have the wrong name. To check, change directories to `/dev` and `/etc` and look for either a `sky-sd` or `ttys-sd` file. If you find either of these files, you may do one of the following:

1. Log in, then log out as *sysdiag*. When `sysdiag` exits normally, it changes the files to their proper names.

```
example login: sysdiag
Password: enter password

login messages are displayed

main menu is displayed
Enter selection and press return: q Return

example# logout

example login:
```

2. Rename the files yourself. Become root (super-user) and use the `mv` command to rename the files.

```
example% su
Password: enter root password
example# mv /dev/sky-sd /dev/sky
example# mv /etc/ttys-sd /etc/ttys
example# exit
example%
```

System Security

Because `sysdiag` has its own user ID with root permissions, it should have a password installed. You will not be able to log in and run sysdiag unless you edit the `passwd` file. To do so, you may use the `vipw` command, or the following:

```
example% su   become super-user
password: enter super-user password
example# cd /etc   change directories to /etc
example#vi passwd  edit the passwd file
```

You will now see a line in the passwd file that looks like this:

```
sysdiag:*:0:1:System Diagnostic:pathname
```

Take the asterisk out of that line; it keeps anyone from logging in as "sysdiag". When you are done, the line should look like this:

```
sysdiag::0:1:System Diagnostic:pathname
```

Now, log in as sysdiag:

```
example login: sysdiag

login message is displayed

sysdiag main menu is displayed
```

Now, by selecting the **p** option from the main menu, you can create a sysdiag

password. `sysdiag` will place the password where the asterisk was in the `/etc/passwd` file, and whenever anyone logs in as sysdiag, the program will ask for that password:

```
example login: sysdiag
Password: enter the password
```

Another way to change the password is to log in as root and enter

```
example# passwd sysdiag
```

You will then receive the usual password prompts:

```
example# passwd sysdiag
Changing password for sysdiag on example
New password: enter password
Retype new password: enter password again
example#
```

`sysdiag` Organization

When you login as *sysdiag*, its `.login` file starts up the `sysdiag` program, which in turn displays the main menu. If you select menu items **1**,**2** or **3**, `sysdiag` starts `devtop`, `memtop`, `disktop`, `tapetop` and, when an IPC board is present, `ipctop`. These programs determine how the system is configured, then start one or more of the following tests:

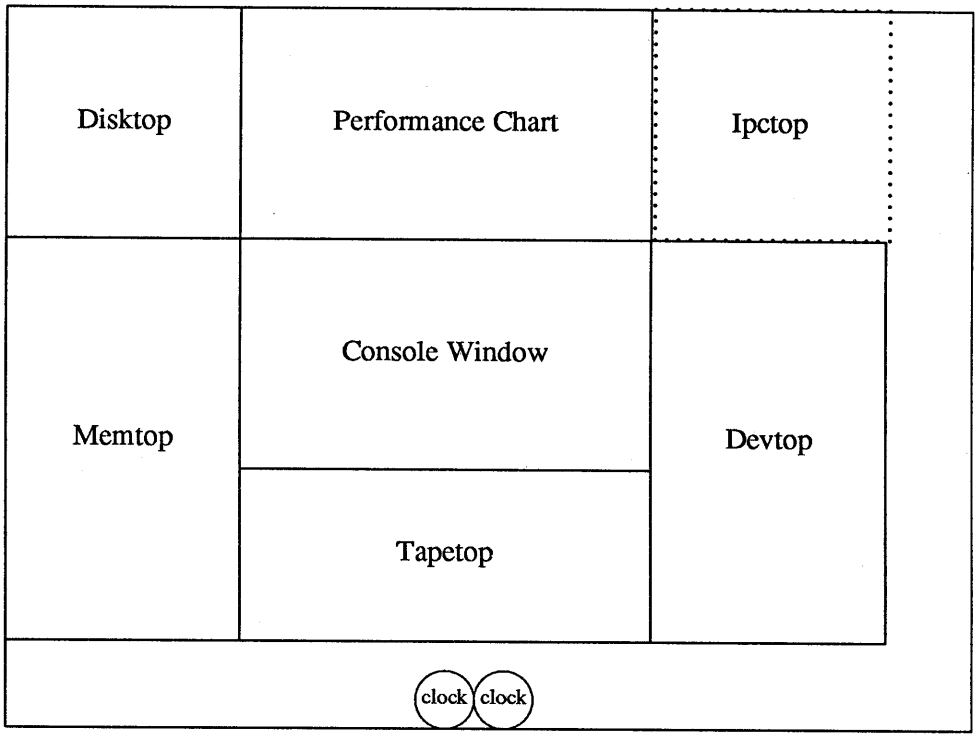
sysdiag *Tests*				
devtop	*disktop*	*memtop*	*tapetop*	*ipctop*
devtest	disk	pmem	devtest	ipctest
color		vmem		
fpatest				
sunlink				
gpmtest				
gp2test				
enet				
mc68881				
softfp				
sptest				
ffpusr				
fputest				
dcp				
softdcp				

The `sysdiag` program uses the contents of the `/dev` directory to help determine the system hardware configuration. The files in `/dev` should accurately reflect the actual hardware on the system. The list of tests `sysdiag` runs is determined by the `/dev` directory, commands entered in the options menu, and use of the *Select Mode* option in the main menu.

You may run `sysdiag` from a workstation or an ASCII terminal. The menus appear the same regardless of the type of display you use. When `sysdiag` is running tests, the display varies, depending on whether you use a workstation or a terminal.

`sysdiag` With SunView

When running tests on a Sun workstation, `sysdiag` creates a SunView environment with one window each for primary memory, secondary memory (disk and tape) and peripherals, in addition to a console window, a window containing performance charts, and when an IPC board is present, an IPC window . Here is a diagram showing the positions of `sysdiag` windows:



Open the left clocktool to display the precise time in 24-hour mode. In the event of a system crash, the clock will reflect the time of the crash.

`sysdiag` with a Terminal

When run from an ASCII terminal, `sysdiag` cannot create separate windows for each test. It runs the same tests and creates the same files, but it displays its message output onto the terminal screen. As a result, the test message lines are mixed together.

Log Files

The `sysdiag` program stores messages in *log files*. Log files are regular SunOS text files that live in the directory `/usr/adm/sysdiaglog`. `sysdiag` generates several types of log files:

- Logtimes — A text file containing the starting and ending messages for `sysdiag`.
- Core files — Certain error conditions cause core dumps; `sysdiag` changes the name of the core file to `core.`*n*, where *n* starts at 1 and increments for each new core dump.
- log *script* files — Scripts place messages in text files with the name `log.script.`*n*, where *script* is the name of the script, and *n* is a number that starts at 1 and increments each time you run `sysdiag` without resetting log files.
- log *test* files — Test routines place messages in text files with the name `log.`*test*`.`*pid*, where *test* is the name of the test routine, and *pid* is the SunOS process number of the test. Every time it runs, `sysdiag` creates new test files.
- log.sky — The Sky board test (Sun-2 only) puts messages into files with the name `log.sky.`*n*, where *n* is a number that starts at 1 and increments each time you run `sysdiag` without resetting log files.

2

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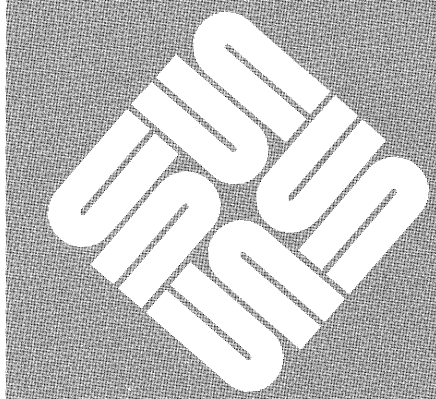


2

Using Sun System Diagnostics

2.1. Editing the `passwd` File

You will not be able to log in and run `sysdiag` unless you do the following, first, while running the SunOS operating system:

```
example% su   become super-user
password:  enter super-user password
example# cd /etc   change directories to /etc
example#vi passwd  edit the passwd file
```

You will now see a line in the `passwd` file that looks like this:

```
sysdiag:*:0:1:System Diagnostic:pathname
```

Take the asterisk out of that line; it keeps anyone from logging in as *sysdiag*. When you are done, the line should look like this:

```
sysdiag::0:1:System Diagnostic:pathname
```

2.2. Logging In

If you are logged in presently, you must fully log out. If you are using the window system, you must exit `SunView` first, then log out:

```
example% logout

example login:
```

Once you are logged out and have received the *login* prompt, login as *sysdiag*:

```
example login: sysdiag
Password:  enter password

login messages are displayed

sysdiag main menu is displayed
```

Select the **p** option from the main menu to create a `sysdiag` password. The *Main Menu* section in this chapter describes this command. Sysdiag will then place the password where the asterisk was in the `/etc/passwd` file, and whenever anyone logs in as *sysdiag*, the program will ask for that password.

You can run `sysdiag` as long as you like. However, to obtain accurate test results, you should run the tests until they all have finished at least one complete pass.

If a test finds a hardware error, it displays a message, places an entry in the appropriate log file, and quits.

When you stop the tests, `sysdiag` displays the log files, using the SunOS `more` command, then asks if you want to reset them. If you answer **y** it erases all of the log files; if you answer **n**, they remain, and the next time you run `sysdiag` it generates a new set of log files with a higher number appended to the file names. After taking care of the log files, `sysdiag` returns to the main menu.

2.3. Main Menu

The `sysdiag` main menu will look something like this:

```
System Diagnostics                                sun microsystems

SELECTIONS:                                          Version x.xx
-----------------------------------------------------------------
1 - Automatic mode of System Diagnostics.
2 - Verify mode of System Diagnostics.
3 - Select mode of System Diagnostics.
4 - Single test mode of System Diagnostics

o - options for System Diagnostics.
s - set date and time.
d - display System Diagnostic log files.
r - reset System Diagnostic log files.
c - change System Diagnostics console type: (sun)
p - change System Diagnostics password.

q - quit System Diagnostics.


Enter selection and press return:
```

Menu Selections

1

Selecting **1** from the main menu starts `sysdiag`'s `Automatic mode`. This is the simplest way to test the system, and the method most users choose. If you choose `Automatic mode`, `sysdiag` immediately enters its SunView environment (if you're on a workstation), and begins probing for devices to test. It starts all appropriate tests for the devices it finds. `sysdiag` runs each test continuously until you halt it, it finds a hardware error, or there is a problem with `sysdiag` itself.

2

Selecting **2** from the main menu starts `sysdiag`'s `Verif` verify mode, `sysdiag` probes `/dev` for the devices instal tem. It lists the devices it found, then asks you if the list is c answer **n**, it asks you to correct the problem and returns t

If you answer **y** it continues and performs all of the operations described in Automatic mode.

If you have any doubt about the system configuration, or of the accuracy of the */dev* directory, you should run `Verify mode`.

3 Selecting **3** from the main menu starts `sysdiag`'s `Select Mode`. This mode starts the same way automatic mode does; `sysdiag` immediately enters its SunView environment (if you're on a workstation), and starts probing for devices to test. But instead of running a test for every device it finds, the program first prompts you for the individual hardware tests you want to run.

4 Selecting **4** from the main menu starts `sysdiag`'s `single test mode`. This mode brings up a new menu, from which you may select one of these tests:

- disktop tests
- memtop tests
- tapetop tests
- devtop tests

In this mode, the message display is similar to that when running `sysdiag` on an ASCII terminal.

After you have selected the tests, `sysdiag` performs according to a limited sub-set of parameters for the operations described in `Automatic mode`, using only the tests chosen. Note that `sysdiag` stresses the system more when many tests are run simultaneously, thus providing more accurate test results.

o *`[filename]`*

Selecting **o** with no argument displays the `options menu`. It is described in the next section. If the **o** option is entered followed by a *filename*, `sysdiag` will immediately execute the `restore options` command (from the options menu). This method can be used as a shortcut, to configure `sysdiag` from the configuration information that has been previously stored in the file. See the `Options Menu` section for information on storing and saving `sysdiag` configurations. Tests for options such as the Integrated Personal Computer (SunIPC) and data communications boards reside in this menu.

s

Selecting **s** allows you to `set date and time`. You are shown the current system time, and asked to enter a new time. If the time is correct, press return. Otherwise, enter the new time and date, then press return.

d

When you select **d**, `sysdiag` *displays log files*. The program uses the SunOS `more` command to display all of the log files in the `/usr/adm/sysdiaglog` directory.

r

When **r** is selected in the main menu, `sysdiag` resets log files. The program removes all of the log files in the `/usr/adm/sysdiaglog` directory.

c With this option you may leave the `sysdiag` console type unchanged or enter the type of terminal you wish to use:

```
Enter the console terminal type, no for no change:

(The valid console types are those that have an entry in the /etc/termcap
file, such as vt100, Wyse, and so on).
```

p Entering **p** prompts you to change the `sysdiag` password. The interaction is very similar to the SunOS `passwd` command:

```
Changing password for sysdiag on hostname
Old password: (enter old password, if any)
     (prompted only if password was assigned before)

New password: (enter new password)
New password: (enter new password)
```

q

Selecting the **q** option causes `sysdiag` to quit System Diagnostics.

2.4. Options Menu

Selecting **o** from the main menu displays the options menu:

```
SYSTEM DIAGNOSTIC OPTIONS
-------------------------------------------------
i - intervention tests (disabled)
m - manufacturing tests (disabled)

f - file (save) current options.
o - use (restore) options previously filed.
lo - list options names previously filed.
h - help information for options.
q - quit option menu and return to the selection menu.
Q - Quit System Diagnostics.


Enter selection and press return:
```

i

If you enter **i** in the options menu, you enable the `intervention tests`. The options menu is redisplayed with additional intervention menu items. The intervention tests and the new menu items are described in a later section.

m

If you enter the **m** command in the options menu, you will start the `manufacturing tests` dialogue. This dialogue is described in a later section.

NOTE ***The commands in the manufacturing test dialogue are designed for use during the manufacture of Sun hardware. Most of the tests require special fixtures or provide functionality that is not useful to the customer.***

f *filename*

Entering **f** allows you to `file current options` that have been set in this session. The current configuration of `sysdiag` is saved in *filename*, which can be any name you choose. These options can be used later to configure `sysdiag` during another session (see the **o** option, below).

o *filename*

The **o** option is used to configure `sysdiag` with the option settings saved in a configuration file named *filename*. The file is built using the **f** command. All of the configuration files are stored in the `/usr/adm/sysdiaglog` directory.

lo This selection lists `sysdiag` option names previously filed by the `file current options` (**f**) selection.

h *menu_option*

Entering **h** with no argument displays the `help information menu`. This menu displays help messages that describe the different option commands. The help menu is described in a later section.

Entering **h** with a *menu_option* argument displays the help message for the specified selection directly, without leaving the options menu. *menu_option* can be any of the selections listed in the options menu, including the help selection.

q

Entering **q** from the options menu causes you to `return to the main menu`. This command is used to exit the options menu.

Q

Selecting the **Q** option causes `sysdiag` to `quit System Diagnostics`. If you logged in as "sysdiag", this command logs you out. If you logged in as super-user (root) and invoked `sysdiag` from the SunOS command prompt, the **Q** command returns the SunOS prompt.

Intervention Test Configuration

The serial port, tape, printer port, SunLink, SunIPC, and ALM2 tests are `intervention` tests; they require you to perform some actions before running them.

If you choose `intervention tests` in the options menu, `sysdiag` displays the prompt shown below.

```
Allow intervention tests? y for yes/n for no, press return: y
```

```
*********************************************
*   If testing tape drives, clean  the tape   *
*   drive  read/write  heads  and install a   *
*   scratch tape in each drive to be tested.  *
*********************************************

  Press return to continue.
```

Choose **y** to enable the intervention tests, or choose **n** to disable them. If you answer **n**, the options menu is redisplayed.

If you answer **y**, the tape drive message (shown above) is displayed: when you press Return, `sysdiag` displays the options menu, showing additional `intervention test` selections.

The options menu now has four new entries; `t` (tape), `s` (serial port), `pp` (printer port) and `sl` (SunLink) and, when an SunICP board is present, `p` (SunICP). These lines appear between the `i` and `m` options. The following menu shows the options menu with the intervention tests enabled. The new options are shown here in boldface type.

CAUTION **Any tape in the 1/4 inch tape drive will have its data destroyed when the tape test runs. Make sure you insert a scratch tape in the drive if you enable the tape test.**

The tape drive test is enabled and set to its default configuration when the intervention tests are enabled. To prevent errors, you must load a scratch tape in the tape drive (see the *Tape Test* section for details). The data communications processor and serial port tests remain inactive until you select ports for them to test.

```
SYSTEM DIAGNOSTIC OPTIONS
-------------------------------------------------------------
 i - intervention tests (enabled)
 t - 1/4 inch tape drive options (short test, 4 tracks)
 s - serial port test options, loop port(s) tty: (none)
 sl - SunLink test options, loop port(s) dcp/mcp: (none)
pp - printer port test options, loop port(s) mcpp: (none)
 p  - IPC test options, disk drive(s), loop port(s) (none)
 m - manufacturing tests (disabled)

 f - file (save) current options.
 o - use (restore) options previously filed.
lo - list options names previously filed.
 h - help information for options.
 q - quit option menu and return to the System Diagnostic selection menu.
 Q - Quit System Diagnostics.


 Enter selection and press return:
```

t

`tape drive options` allows you to describe the type of tape drive you have on your system. The system prompts you for specific tape drive information. Details concerning this command are in the *Tape Drive Options* section of this manual.

s

The `serial port options` selection allows you to select the serial ports you want to test on your system. The serial port test is disabled until you select which ports you want to test. Details for selecting the serial ports to test are in the *Serial Port Options* section of this manual and in on-line help.

sl

`SunLink test options` provide a selection of data communication ports to test. The data communications processor test is disabled until you actually select which ports to test. Details for selecting the data communication ports to test are in the *Data Communications Port Options* section of this manual and in on-line help.

pp `printer port test options` provide a selection of MCP-based printer ports to test. The printer port test is disabled until you select which ports to test. Details for selecting the printer ports are in the *Printer Port Test Options* section of this manual and in on-line help.

p `IPC test options` provide a selection of floppy disk drives and SunIPC board printer ports to test. This option only appears on the menu when a SunIPC board is present in the system. Details for selecting drives and printer ports are found in *IPC Test Options* and in on-line help.

Tape Drive Options

To change the configuration of the `tape drive test`, enter **`t`** from the options menu. This option is only visible after enabling the `intervention tests` option (see the *Options Menu* section for details). After entering **`t`**, you answer a series of questions. Your answers configure the tape drive and select which test to run (long or short test). Appendix A will help you determine the answers required for your specific configuration. The example that follows shows every question `sysdiag` can ask. You may not be asked all of the questions in this example if you answer differently.

After describing the tape drive to `sysdiag`, load a "scratch" tape (tape that can be overwritten) into the drive. It is a good idea to clean the tape read/write heads, so the tape test returns accurate results.

NOTE *Use a good quality tape. If you are running the long test, use a tape that is 450 feet long. The test may write past the end of a tape that is too short, producing incorrect test results, or it may not test all of the tape drive tracks on a tape that is too long.*

```
Enter selection and press return: t

Long 1/4 inch tape test? y for yes/n for no, press return: y
1/4 inch tape drive tracks =? Enter 4 or 9: 9
Test "QIC-24"? y for yes/n for no, press return: y
Is the tape controller an Emulex? y for yes/n for no press return: y
```

CAUTION: If the **QIC-24** option is selected, and the tape drive does not support it, the SunOS operating system will display an error message on the console. To avoid this problem, read ***Appendix A*** to determine what options your tape drive supports before configuring this test.

When you answer all of the questions, `sysdiag` re-displays the options menu, with the new tape options (shown on the following page in bold type) updated to reflect your choices. The example on the following page is what the menu looks like after entering the choices shown above.

```
SYSTEM DIAGNOSTIC OPTIONS
-------------------------------------------------------------------------
 i - intervention tests (enabled)
 t - 1/4 inch tape drive options (long test, 9 tracks, QIC-24, Emulex ctlr)
 s - serial port test options, loop port(s) tty: (none)
sl - SunLink test options, loop port(s) dcp/mcp: (none)
pp - printer port test options, loop port(s) mcpp: (none)
 m - manufacturing tests (disabled)

 f - file (save) current options.
 o - use (restore) options previously filed.
lo - list option names previously filed.
 h - help information for options.
 q - quit option menu and return to the selection menu.
 Q - Quit System Diagnostics.


 Enter selection and press return:
```

The new text in parentheses (shown in bold in this menu) displays what options are currently selected. In this case the example reflects the answers given in the example on the previous page. The display line

```
t - 1/4 inch tape drive options (long test, 9 tracks, QIC-24, Emulex ctlr)
```

can be interpreted from these descriptions:

- **long test** — the long tape test is enabled.
- **short test** — the short tape test is enabled.
- **9 tracks** — the workstation has a 9 track tape drive.
- **4 tracks** — the workstation has a 4 track tape drive.
- **QIC-24** — the workstation's tape drive supports the QIC-24 tape format.
- **Emulex ctlr** — the workstation uses an Emulex tape controller board.

Appendix A contains more information on tape drives and controller boards. After you have configured the tape options, you can make other configuration changes, or enter **q** if you are finished. To turn off intervention tests, enter **i**, then answer **n (o)** to the prompt.

Serial Port Options

To enable or reconfigure the `serial port test`, enter **s** in the options menu. This option is only visible after enabling the `interventions test option` (see the *options menu* section for details). After entering **s**, you are prompted for the names of the ports you want to test. Type in the ports you want to test after the prompt, using the format described below. To disable the test, enter **none** or simply press Return without entering any ports.

There are two types of serial port tests: single port loopback and dual port loopback. To select a single port loopback, enter the ports you want to test (**a** or **b** for internal ports, **0** through **3** for SCSI ports, and **00** to **3F** for ALM ports) individually.

ALM ports are more easily selected for test under the manufacturing tests sub-menu.

Serial port tests will not pass unless you install the correct loopback connectors on the serial ports you are testing. On every **single** port in the configuration line, attach a single port loopback connector. For every **pair** of ports connected by a dash, link them with a loopback cable.

For a dual port loopback, enter a pair of ports connected by a dash (-). Separate each single and dual loopback entry with a space.

The test refers to ALM2 ports as ttyh0-ttykf.

```
Enter selection and press return: s

Select serial ports to test, press return: 0 a-b [Return]
```

```
*******************************************************
*   Install the appropriate test fixture(s) on the    *
*   selected serial port(s) before starting tests.    *
*******************************************************

 Press return to continue.
```

When you have selected the desired ports, `sysdiag` warns you to install the correct loopback connectors, then re-displays the options menu, with the options updated to reflect your choices, as shown in the following diagram.

```
 SYSTEM DIAGNOSTIC OPTIONS
 -------------------------------------------------
 i - intervention tests (enabled)
 t - 1/4 inch tape drive options (short test, 4 tracks)
 s - serial port test options, loop port(s) tty: (0 a-b)
sl - SunLink test options, loop port(s) dcp/mcp: (none)
pp - printer port test options, loop port(s) mcpp: (none)
 m - manufacturing tests (disabled)

 f - file (save) current options.
 o - use (restore) options previously filed.
 h - help information for options.
 q - quit option menu and return to the selection menu.
 Q - Quit System Diagnostics.


 Enter selection and press return:
```

The new serial port configuration is shown above in boldface type. All of the selected ports appear in the serial port menu entry.

After indicating the serial ports to test, install a loopback cable between every port pair, and a loopback connector on every single port you indicated. The example above requires a single port loopback connector for SCSI port 0, and a dual port loopback cable between internal ports a and b.

SunLink Test Options

To enable or reconfigure the data communications processor test, enter **sl** in the options menu. This option is only visible after enabling the `interventions test option` (see the options menu section for details). After entering **sl**, you are prompted for the the ports you want to test. Type in the ports you want tested as shown below. To disable the test, enter **none** or simply press Return without entering any ports.

The data communication processor test will not pass unless you install the correct loopback connectors on the ports you are testing. On every port you enter in the configuration line, attach a loopback connector.

To select which ports to test, enter the port names, separated by spaces. The dcp port names consist of a letter (a,b,c,or d) followed by a number (0 - 3). The mcp port names are a number from 0 - 15. The letter indicates the data communications processor board, and the number shows which port on that board to check.

For the SCP board, the RS-232 ports are 0 and 3 while the RS-449 ports are numbers 1 and 2.

The MCP controller board port numbers are assigned as follows:

Board #	*RS-232/423* Port #'s	*RS-449* Port #'s
1	0,3	1,2
2	6,7	4,5
3	10,11	8,9
4	14,15	12,13

If you only have one board on your system, it will be board **a**. Additional boards are lettered in increasing order. In this example, the first three ports on the first data communications processor board are being tested.

```
Enter selection and press return: sl Return
```

```
Select the SunLink ports to test, press return: a0 a1 a2
Return
```

This message now appears on the screen:

```
*****************************************************
*   Install the appropriate test fixture(s) on the   *
*   selected port(s)  before starting tests.         *
*****************************************************

  Press return to continue.
```

After you install the loopback connectors on the ports to be tested, press Return, and the program informs you:

```
sysdiag: Initializing the data communications processor.
```

After you have entered the data communication ports to test, and installed loopback connectors (in this example, on ports **0**, **1** and **2** on board **a**),

`sysdiag` displays the loopback connector warning, then redisplays the options menu, with the options updated to reflect your choices. To begin testing, enter **q** to bring up the main menu and select a test mode from that menu.

```
 SYSTEM DIAGNOSTIC OPTIONS
 ---------------------------------------------------------
 i - intervention tests (enabled)
 t - 1/4 inch tape drive options (short test, 4 tracks)
 s - serial port test options, loop port(s) tty: (none)
sl - SunLink test options, loop port(s) dcp/mcp: (a0 a1 a2)
pp - printer port test options, loop port(s) mcpp: (none)
 m - manufacturing tests (disabled)

 f - file (save) current options.
 o - use (restore) options previously filed.
lo - list option names previously filed.
 h - help information for options.
 q - quit option menu and return to the selection menu.
 Q - Quit System Diagnostics.


 Enter selection and press return:
```

Printer Port Test Options

After you enter the printer port selection:

```
Enter selection and press return: pp [Return]
```

`sysdiag` will prompt you to select the printer ports to test:

```
Select the printer ports to test, press return: 0 1 2 3
[Return]
```

The entry in the example above would test all Multiple Communication Processor (MCP) printer ports. If none are to be tested, just press [Return]. You may enter any number of printer ports as long as they are separated by spaces. Here are example entries:

Port entry	***What is Tested***
0	test single port mcpp0
0 2	test ports mcpp0 and mcpp2
0 1 2 3	test all mcp printer ports(mcpp0-mcpp3)

The program now prompts you to install loopback connectors for every port you intend to test:

```
*****************************************************
*   Install the appropriate test fixture(s) on the   *
*   selected port(s)  before starting tests.         *
*****************************************************

  Press return to continue.
```

Install a parallel printer loopback connector on each port to be tested and then press [Return]. Sysdiag now displays your choices and lets you know that it has initialized the multiple communications processor board:

```
sysdiag: Initializing the multiple communications processor.
```

IPC Test Options

NOTE *This option will appear on the options menu ONLY when SunIPC hardware is present in the system. In that case, a special* `ipctop` *window appears in the upper right corner of the screen, and a "pc" icon is at the bottom of the screen during a test cycle.*

CAUTION **ONLY DRIVE "B" ON A SunIPC WILL BE TESTED. DRIVE "A" MUST NOT HAVE A DISKETTE INSERTED OR THE IPC TEST WILL FAIL.**

After you select the IPC test option, sysdiag prompts you to enter which SunIPC disk drives to test, and then which SunIPC parallel ports to test. When prompted, enter the disk drives and/or parallel ports that you wish to test. If none are to be tested, enter **none** or press [Return].

At the prompt, you may enter any number of disk drives or parallel ports, in any order, separated by a space. Sysdiag only tests the B disk drives.

The SunIPC disk drives are entered as **d0** through **d3**. The SunIPC parallel ports are entered as **pp0** through **pp3**. The suffix number signifies to which SunIPC board the disk or parallel port is attached.

In the examples that follow, you have selected **p** from the options menu, and are asking sysdiag to test the B disk drives on IPC boards 2, 0 and 3, and the parallel ports on IPCs 1 and 3:

```
Select the SunIPC disk drives to test, press return: d2 d0 d3
[Return]
```

This message now appears on the screen:

```
*************************************************************
*   Install test diskette(s) in the selected IPC B          *
*   disk drive(s)before starting tests.                     *
*   Note: Do not install a diskette in any A drive,         *
*   the IPC test will fail                                  *
*************************************************************

Select the parallel ports to test, press return: pp1 pp3 Return
```

This message now appears on the screen:

```
*******************************************************
*   Install the appropriate test fixture(s) on the    *
*   selected port(s)  before starting tests.          *
*******************************************************

  Press return to continue.
```

Here are descriptions of entries that may be made after the appropriate prompt:

Port entry	*What is tested*
d0	test the B disk drive on IPC 0
d2 d0 d3	test the B disk drives on IPCs 2, 0, and 3
pp0	test the parallel port on IPC 0
pp1 pp3	test the parallel ports on IPCs 1 and 3

All B disk drives to be tested must have a formatted double density floppy diskette installed. All parallel ports to be tested must have a loopback connector installed.

After you have entered the drives and/or ports that you want to test, the options menu is displayed again, echoing your choices:

```
SYSTEM DIAGNOSTIC OPTIONS

-------------------------------------------------------------------
 i - intervention tests (enabled)
 t - 1/4 inch tape drive options (short test, 4 tracks)
 s - serial port test options, loop port(s) tty: (none)
sl - SunLink test options, loop port(s) dcp/mcp:
pp - printer port test options, loop port(s) mcpp: (none)
 p - IPC test options, disk drive(s) (d2 d0 d3), loop port(s) (pp1 pp3)
 m - manufacturing tests (disabled)

 f - file (save) current options.
 o - use (restore) options previously filed.
lo - list option names previously filed.
 h - help information for options.
 q - quit option menu and return to the selection menu.
 Q - Quit System Diagnostics.


 Enter selection and press return:
```

To run the test, enter **q** to return to the main menu, and select a test mode. A "personal computer" icon will appear at the bottom of the screen. If you "click" the left mouse button on the icon, a window that contains PC-NFS messages will be displayed.

Manufacturing Test Options

CAUTION **Manufacturing tests are for use by manufacturing only. They require custom test jigs, and may interfere with other tests if you select conflicting options.**

When you select `manufacturing tests`, interactive dialog takes place (if manufacturing tests are formerly enabled), as shown below.

```
MANUFACTURING TEST OPTIONS
-------------------------------------------------------------------
Allow special manufacturing tests? y for yes/n for no, press return: y

 v - vmem wait time (vmem wait = 0)
 s - serial ports boards ( )
 g - graphics processor ( )
sb - shoebox testing ( )
mw - manufacturing windows ( )
re - run on error ( )
 h - help information for manufacturing options.
 q - quit manufacturing test option menu.
 Q - Quit System Diagnostics

Enter selection and press return:
```

The following paragraphs give a brief description of each option.

v **vmem wait =***delay* determines how long to wait before re-running the virtual memory test. The delay can be 0, 30, 60, or 90 minutes. This option is intended solely for use on diskless systems, to reduce network traffic.

s If you select the **s** option from the manufacturing test options, this menu prompts you to enter the number of device drivers on each board you intend to test.

When testing the ALM2 board, you are assumed to have a fixed loopback configuration, and you will need a special loopback cable. The test refers to the ALM2 as `sph, spi, spj and spk`.

```
SERIAL PORT BOARD
-----------------------------------
 0 - No device drivers ( )
 1 - No device drivers ( )
 2 - No device drivers ( )
 3 - No device drivers ( )
 h - No device drivers ( )
 i - No device drivers ( )
 j - No device drivers ( )
 k - No device drivers ( )

 q - quit serial port board tests menu.
 Q - Quit System Diagnostic.

Enter selection and press return:
```

The serial port board test uses a special test jig capable of connecting 8 or 14 serial ports for the Sun-2/120 or Sun-2/170 ALM option. Eight loopback cables are required to test the Sun VME ALM option.

g When a GP1 board is installed, this selection brings up a prompt that asks if you want to test the graphics processor board. Enter **y** for "yes", **n** for "no", and then press Return. If a GP2 board is present, `sysdiag` announces the fact and assumes that the test is to be performed on it.

NOTE *Before running the graphics processor tests, you must become super-user and edit the* `/etc/rc.local` *file so that the line shown below has a "#" symbol in front of it, and then re-boot the system. By "commenting-out" this line of code, you disable the ability of the operating system to use the graphics processor board. When you are finished testing, be sure to remove the "#" symbol from the file, and re-boot again.*

```
example# cd /etc Return

example# vi rc.local Return

find this line in the file and insert the "#" symbol:

# /usr/etc/gpconfig gpone0 -f -b cgtwo0        > /dev/console

:wq
```

Now, re-boot the system so that the change you have just made can take effect.

sb This selection asks if you want to test a "shoebox" (mass storage subsystem). It only tests SCSI disks, and tapes 1 - 7, using `disktop`, `devtop` and `tapetop`.

mw This selection brings up a menu that customizes the test windows, if desired. It changes `sysdiag` window placement and the font and point size of the displayed text. The menu looks like this:

```
1 for Sun 2/3 manufacturing windows using "gallant.r.19" fonts.
2 for Sun 3/4 high resolution windows using "gallant.r.19" fonts.
3 for Sun 2/3 wide windows using "gallant.r.19" fonts
4 for normal sysdiag windows
```

If you select **1**, the windows are sized according to the parameters in the `/usr/diag/sysdiag/.sunview/manuf-1` file.

If you select **2**, the windows are sized according to the `/usr/diag/sysdiag/.sunview/manuf-2` file.

If you select **3**, the windows are sized according to the `/usr/diag/sysdiag/.sunview/manuf-3` file.

If you select **4**, the windows are placed as shown in *Chapter 1* and use whatever font and point size are present in the `.sunview` file.

re This selection asks you if you want to enable "run on error". If enabled, `sysdiag` either retries or starts over when tests fail. If this option is disabled, tests are stopped when an error occurs.

After the selections have been entered, `sysdiag` redisplays the menu, showing the options that have been entered during the dialog. The new options are displayed in boldface type as shown for the regular options:

```
SYSTEM DIAGNOSTIC OPTIONS
-------------------------------------------------------------------------
i - intervention tests (disabled)
m - manufacturing tests (enabled gp&b sp2-16 vmem wait= 90)

f - file (save) current options.
o - use (restore) options previously filed.
h - help information for options.
q - quit option menu and return to the System Diagnostic selection menu.
Q - quit System Diagnostics and exit to the operating system.


Enter selection and press return:
```

The new text in parentheses, displayed in the manufacturing test selection, shows what options are currently selected. The line can be interpreted as follows:

- **enabled** — manufacturing test is enabled.
- **gp&b** — both the graphics processor and graphic buffer are selected.
- **gp** (in place of gp&b) — only the graphics processor is selected.
- **sp***board#* **-** *#ofports* — one or more of the serial port board tests are selected. One entry per board. The number of ports can be 8 for the Sun-2/120; 8 or 14 for the Sun-2/170; and 0-16, 1-16, or 2-16 for Sun VME ALM boards.
- **vmem wait =***delay* — how long to wait before re-running the vmem test. The delay can be 0, 30, 60, or 90 minutes.

Option Help Menu

When you select `h` from the options menu, `sysdiag` displays the the help menu. This menu has an entry for each of the major commands in the option menu. Each help menu entry has the same name as the option command it describes. The on-line menu represents the latest version of this software and supercedes the examples shown here. A special Manufacturing Option menu follows the one shown below:

```
                    OPTION HELP INFORMATION

*************************************************************************
    i - intervention tests.
    t - 1/4 inch tape drive options.
    s - serial port test options.
   sl - SunLink test options.
   pp - printer port test options.
    p   IPC test options.
    m - manufacturing test options.

    f - file (save) current options.
    o - use (restore) options previously filed.
   lo - list option names previously filed.
    h - help information for options.
    q - quit option help and return to the previous menu.
    Q - Quit System Diagnostics.
*************************************************************************

 Enter help selection and press return:
```

```
          MANUFACTURING OPTION HELP INFORMATION

*************************************************************************
    v - vmem wait time.
    s - serial port boards.
    g - graphics processor.
   sb - shoebox testing.
   mw - manufacturing windows.
   re - run on error.
    h - help information (general) for manufacturing options.
    q - quit option help and return to the previous menu.
    Q - Quit System Diagnostics.
*************************************************************************

 Enter help selection and press return:
```

This menu contains an entry for every selection in the options menu. For information about a `sysdiag` option, enter the corresponding letter at the prompt. The menu will display a screen full of text about the option. Press **Return** to go back to the help menu. From the help menu, use **q** to return to the options menu, or **Q** to exit `sysdiag`.

You can display a help message directly from the options menu. From the options menu, enter **h** followed by the help option letter. The corresponding help message is displayed immediately, without going through the help menu. After displaying the help message, the program redisplays the options menu.

2.5. Exiting `sysdiag`

The procedure for stopping `sysdiag` involves two steps; stopping the tests that are running (if any) and exiting from `sysdiag` itself.

The procedure for stopping the tests in progress varies, depending on whether `sysdiag` is running from a terminal or a workstation.

To halt `sysdiag` from a workstation:

1. First end any tests in progress. Enter **^C** (while holding down the Control key, press **C**) in each window that has a test running. Use the mouse to move from window to window.
2. Next, use the mouse to move to the gray background area and press the right hand mouse button to activate the SunView menu. Select `Exit SunView`, and press the left button to confirm. If no gray area is visible, use **^D** (while holding down the Control key, press **D**) to remove one of the test windows (but NOT the console window!).
3. Before returning to the main menu, `sysdiag` displays the log files, using the SunOS `more` command. Use the space bar to look at all the files, and if you want to stop viewing them, simply enter **q**. `Sysdiag` then asks if you want to reset the log files. Answer **y** if you want to throw away the data in ***all of*** the log files, and **n** if you want to save it. When you have dealt with the log files, the main menu is displayed.

CAUTION **All log files are removed when you answer `y`. To save log files for future viewing, `cd` to `/usr/adm` and move `sysdiaglog` to `sysdiaglog.old`. A `/usr/adm/sysdiaglog` directory is automatically created when `sysdiag` is started.**

4. When the main menu appears, enter your next selection (enter **q** to exit `sysdiag`).

Stopping `sysdiag` from a terminal:

1. Enter the command **`endt`**. When the message:

```
endt: enter "exit" and press return to continue
```

   appears, enter **`exit`**.

NOTE *Expect the* **`endt`** *command to take some time to halt all of the tests. If it appears that the command didn't kill all of the tests, run* **`endt`** *again.*

2. Before returning to the main menu, `sysdiag` displays the log files, using the SunOS `more` command, then asks if you want to reset them. Answer **`y`** if you want to throw away the data in all the log files, and **`n`** if you want to save it. You will then be returned to the main menu, from which you may enter **`q`** to exit.

If `sysdiag` terminates unexpectedly, before attempting to run `sysdiag` again, log in as root and, if testing a Sky board, check to see if `/dev/sky.sd` exists. If so, rename it `/dev/sky`. Also check for `ttys.sd`, which should be `/etc/ttys`. (Refer to the *Caveats* sub-section.)

3

Tests and Messages

Tests and Messages 37

3.1. Tests 37
3.2. Messages 39

3

Tests and Messages

This section briefly describes the tests run by `sysdiag`. It contains descriptions of the the tests themselves, and some of the more common messages that these tests might produce.

3.1. Tests

To check out the hardware, `sysdiag` uses one or more of the following tests:

- The test *disk* exercises the disk controller and drive. It writes two .5 MB files with random data in `/tmp`, then reads and compares them. If the system has no `/tmp` directory, `sysdiag` creates a `/tmp-disktop-sd` directory to fill with random data, and removes it when you exit. `sysdiag` selects the drive by issuing the SunOS command `df` and uses each local drive listed.
- `sysdiag` tests physical memory with *pmem* and virtual memory with *vmem*.

  pmem
  : locates parity errors, hard and soft ECC errors, memory read errors, and addressing problems. It maps, then reads a page repeatedly throughout memory.

  vmem
  : tests virtual memory by allocating, writing, and reading as much virtual memory as feasible. It leaves only the memory necessary for the operating system to function and for device tests to load and execute.

    If *vmem* decides it does not have enough virtual memory to run properly, it exits without testing, generates a proper ending message on the screen and in its log file, with a pass count of 0.

- `sysdiag` provides these device tests; *devtest*, *ffpusr*, *gpmtest*, *color*, *SunLink*, *enet*, *fpatest*, *mc68881*, *dcp*, *softdcp*, *softfp*, *fputest*,*sptest*, *ipctest* and *printer*.

It decides whether to run *devtest* by scanning */dev* for devices that may be tested and it runs *ffpusr* if it can find the SKY board by directly probing for it. If a data ciphering processor is present, `sysdiag` runs the *dcp* test; otherwise it runs tests the DCP software with *softdcp*. The *dcp* tests are only offered in the United States.

`sysdiag` runs *gpmtest*, *sptest*, *SunLink*, *ipctest* and *printer* if they were enabled in the options menu, through the `intervention` selection. *ipctest* automatically runs if a SunIPC board is present in the system, but requires user input concerning the printer port.

The 1/2-inch tape drive should have a scratch tape installed. Since it is an optional test, the tape is not tested unless you select intervention tests in the options menu (see the intervention tests section in this manual for details).

color
This test checks the system's color board (if it is installed).

dcp
This test automatically runs on domestic systems when a Data Ciphering Processor is present on the CPU board.

devtest
tests local disks and 1/2-inch tape drives using generic SunOS routines. It only reads disks but it writes and reads tape drives. For 1/2-inch tape drives, it starts by using the largest block size available (64 Kbytes), and when it gets near the end, where 64K is too big, it uses 512 byte blocks for the remainder.

fpatest
This test checks the floating point accelerator board (on Sun-3 systems only).

ffpusr
tests the Sky FPP board on Sun-2s by using it to perform calculations, then repeating the calculations in software and comparing the results.

fputest
This test checks the floating point unit on Sun-4 systems.

gpmtest
gpmtest only runs if it is enabled from the options menu and requires that you edit the `/etc/rc.local file` and re-boot the system before starting `sysdiag`. The menu selection for gpmtest can only be chosen after enabling the manufacturing tests (see the manufacturing test section for details). *gpmtest* tests the graphics processor and graphics buffer, if they are installed.

gp2test
This test only runs if a GP2 board is present in the system, and the **g** option is selected from the manufacturing tests menu.

ipctest
This test checks SunIPC floppy "B" drives, and the SunIPC printer ports. These tests are only available from the intervention test menu.

MC68881
This test checks the floating point coprocessor (on Sun-3 systems only).

printer
This test checks the printer ports on the MCP board.

reply
This test sends test packets to other systems in the `/etc/hosts` file

and requests acknowledgement that they have received them. In this way, the Ethernet board is tested.

softdcp
On domestic systems, this test checks data encryption software when a data ciphering chip is not present on the CPU board.

softfp
This test checks the software floating point routines (on Sun-3 systems only).

Loopback connectors must be installed on the serial ports and data communication ports to be tested. Since they are optional tests, the SunLink and sptest tests do not run unless you enable them from the intervention tests in the options menu (see the intervention test section in this manual for details).

sptest
The *sptest* only runs if it is enabled from the options menu. The menu selection for `sptest`, **s**, can only be chosen after enabling the intervention tests (see the intervention test section for details) or manufacturing tests (see the manufacturing test section). `sptest` tests the serial ports not located on the CPU board , such as those found on the ALM2 board.

SunLink
This test checks the SCP and MCP data communications processor ports installed on the system. It only runs if it is enabled from the options menu. The menu selection for *SunLink* can only be chosen after enabling the intervention tests (see the intervention test section for details).

3.2. Messages

Most `sysdiag` messages fall into one of three categories: routine messages from tests, messages from the SunOS operating system and error messages from tests.

Sysdiag Messages

The tests generate routine messages in their windows (or on the terminal screen) each time they start and stop, and they generate error messages when they encounter an error. They place copies of all these messages in their log files.

When `sysdiag` generates a message, it identifies the test that is responsible for the message by appending the test name to the message. Messages that appear on the screen without a test name prefix are probably not from `sysdiag`. Sometimes `sysdiag` generates a message and appends a SunOS error message to it.

`sysdiag` generates routine messages when it starts and stops a test and when it finds or fails to find a device. It generates an error message when it encounters an error. It displays messages in the appropriate window, and it places copies of them in the appropriate *log* file.

SunOS Messages

SunOS messages normally appear in the console window if the windows environment is active, and they appear mixed with the other messages if you are using a terminal. The most common SunOS messages are:

```
NOTICE: Window display lock broken after time limit
was exceeded by process n
WARNING: You may see display garbage because of
this action.

or

nd: disk server not responding; still trying
nd: disk server OK


or

mt: unknown command: retension
```

1. The first message occurs when the system is overloaded (a condition that `sysdiag` creates on purpose!).
2. The second occurs when the disk server is busy responding to requests from other systems on its local area network.
3. The third only occurs when `sysdiag` tries to retension a tape, if the system doesn't support the `retension` command.

A

Tape Drive Hardware

Tape Drive Hardware **43**

A.1. Parameters 43
A.2. Identifying Your Tape Drive and Controller 43

A

Tape Drive Hardware

Use this appendix to identify the type of tape drive hardware on your Sun workstation. You need this information to correctly configure the tape test (see the *Tape Test* section in chapter 2 for details).

If the tape test is not configured properly, the SCSI bus can hang, freezing up the system. If this happens, you may have to cycle the system's power and reboot to start it up again.

A.1. Parameters

In order to test your tape drive correctly, you must know this about the drive:

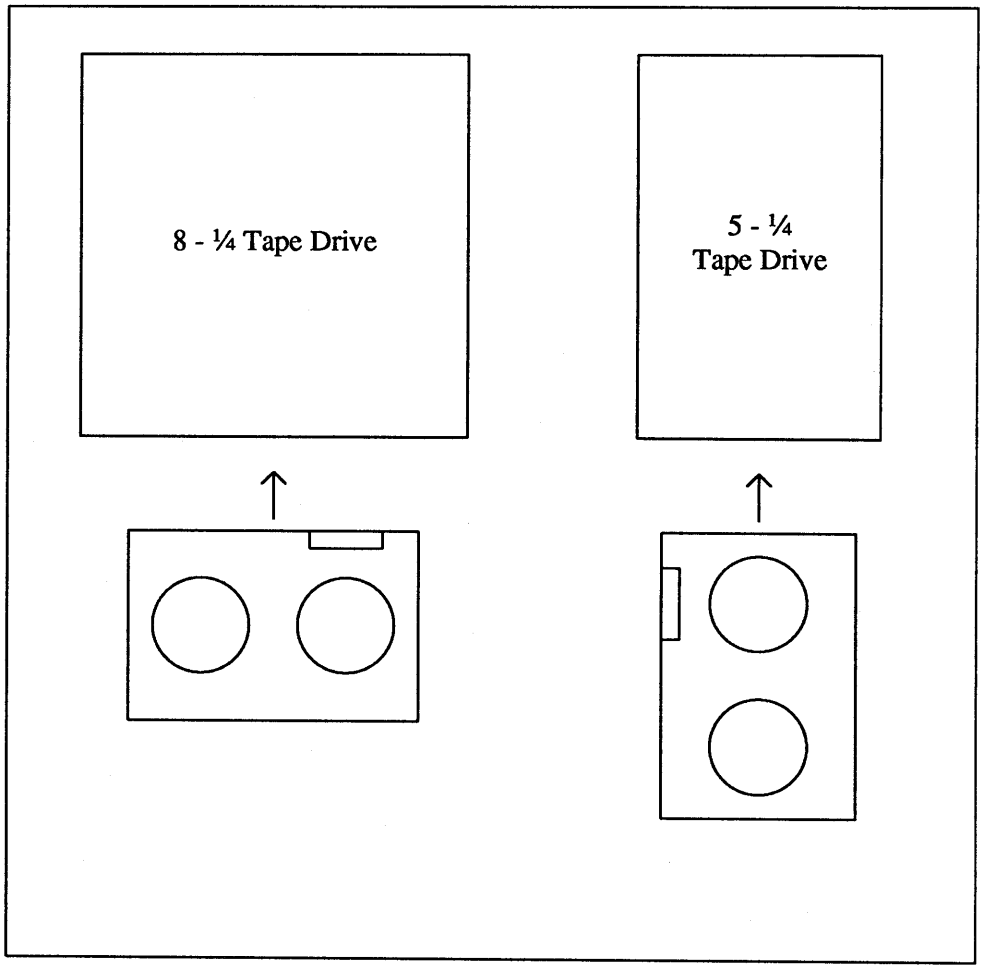
- **Number of Tape Tracks** — does your tape drive have 4 or 9 tape tracks?
- **Tape Formats Supported** — does your tape drive support the QIC-24 tape format?
- **Tape Controller Board** — does your tape drive use the Emulex tape controller board?

If you know the answers to these questions, go no further. You have the information you need to configure the tape test. You also are finished if you do not plan to test the tape drive at all, or are using the the default (short test, 4 tracks) configuration. Otherwise, proceed to the next section.

A.2. Identifying Your Tape Drive and Controller

There are two types of ¼-inch tape drives on Sun systems; the 1/4-inch front-load (8 1/4 inch) drive and the ¼-inch side load (5 1/4 inch) drive (the numbers in parentheses refer to the width of the drive). Tape cartridges are inserted in these drives differently. The front-load drive cartridge is inserted by its wide end; the side-load drive cartridge is inserted by its narrow end. Both drives are represented in the following figure:

Figure A-1 *Front Load and Side Load ¼-inch Tape Drives*



The side-load drives support new features; they are 9-track drives that support QIC-24 format, and are the only drives that use the Emulex tape controller board. See the sections that follow for details.

Number of Tracks

All tape drives in Sun workstations have either 4 or 9 tracks. A workstation with 9 tracks can record more information on a given tape than can be recorded on a 4 track system. Sun-2/120s and "fatboxes" (archive tape drives in a black metal box, used with the 2/120 and 100U/150U) contain 4 track drives. All other drives are 9-track.

Tape Formats

QIC-24 is a data format used on ¼ inch tapes. Sun systems support two ¼ inch tape formats, QIC-11 and QIC-24. All ¼ inch tape drives support QIC-11, and `sysdiag` knows that. QIC-24 is a new, reliable format that is supported on Sun's newer workstations. All of the drives that can use QIC-24 also support QIC-11.

Many tape drives support QIC-24 format, including those listed below. Not all Sun systems support that format, however, due to the revision level of the Boot PROM, which is located on the CPU board. These drives are capable of supporting QIC-24:

- All ¼-inch side-load (5 ¼-inch) tape drives (see previous section for details)
- All drives in Sun-3 Mass Storage Subsystems
- All Sun-2/120s shipped after 6/1/85

The drives in the older systems (Cipher or early Archive drives, for example) only support QIC-11. Cipher drives are identified by the presence of an opaque mylar protective sheet located across the top surface, inside the tape drive cartridge opening.

Revisions of the Sun-3 PROMs that are below 1.8 do not "understand" QIC-24 tape format. You can check the revision level of your PROM by becoming super-user and halting the system with

```
example # sync
example # sync
example # /etc/halt
```

and typing **kb** after the > prompt from the PROM monitor. Any system with a Boot PROM of revision 1.8 or higher will read the new 9-track, QIC-24 tapes.

Also, if you load a QIC-24 tape into a workstation that can read only a QIC-11 tape, you will see an `86A8` or an `86A0` error message from the controller. This error indicates the controller was unable to read the header block on the tape. It is possible that this error will result from a faulty tape even if the tape controller will read QIC-24 tapes, so check your PROM revision level or try another tape if you get this error message.

Controller Board

Every ¼ inch tape drive has a tape controller board driving it. This is a small printed circuit board located inside the workstation.

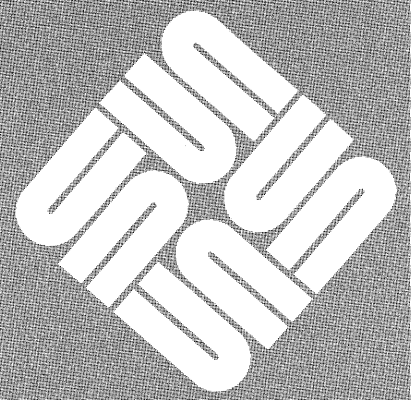
To tell if you have an Emulex controller board, insert a tape into your system. If the tape is running off an Emulex controller, the tape automatically rewinds, and the drive's LED stays on continuously. The Emulex Controller takes about two or three seconds to find the beginning of the tape and then stop.

The Sysgen Controller takes about one second to find the beginning and stop.

B

Multiple Disk Drive Testing

Multiple Disk Drive Testing 49



B

Multiple Disk Drive Testing

`sysdiag` automatically tests the first disk drive it finds in the system. If more than one drive is to be tested, these procedures are required:

For unformatted disks:

1. Refer to the appropriate manual (such as *Installing the Sun Operating System*) and format, partition and label the disk.
2. Create a `/dev` entry as shown under *For formatted disks*, below.
3. Use the command `/etc/newfs` to create a new filesystem for the disk as shown in this example for a second SCSI disk.

```
%su (become super-user)
password: enter password)
#cd /etc
#newfs sdN partition

N may be 1 or 2
```

Refer to the *Maintenance Commands* section of the *SunOS Reference Manual, NEWFS(8)* for more information on the `newfs` command.

For formatted disks:

1. Make sure a `MAKEDEV` *`diskname`* is done for each disk to be tested:

```
#cd /dev
#MAKEDEV sdNg   (for the second SCSI disk)

(N can be 1 or 2)
```

or

```
#cd /dev
#MAKEDEV xy(or xd)Ng   (for the second SMD disk)

(N can be 1, 2 or 3)
```

2. Make sure at least one partition of the to-be-tested disk is mounted onto a file system. (Normally, this is already done on the first disk during SunOS operating system installation). The other disks need to be mounted manually:

```
mount /dev/sd1g /usr2
```

If permanent disk additions are to be made, manually add the line entries for each disk to `/etc/fstab` and then use the `mount -a` command to mount each partition. Refer to *mount(8), fstab(5)* and *mtab(5)* in the *SunOS Reference Manual.*

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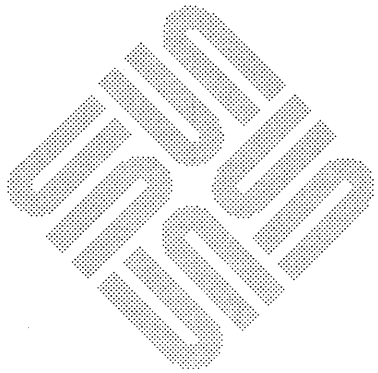

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